

Notice of Allowability

Application No.

10/634,437

Examiner

Eric B. Chen

Applicant(s)

LIU ET AL.

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 8/26/05.
2. ☒ The allowed claim(s) is/are 1-7 and 11-13.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

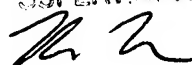
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 10112005.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

WADINE G. NORTON
SUPERVISORY PATENT EXAMINER



EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment was given in a telephone interview with Blake T. Biederman on Oct. 11, 2005.
3. In the claims, for claim 12, delete "tetrabutylamonium" and insert -- tetrabutylammonium --.

Allowable Subject Matter

4. Claims 1-7 and 11-13 are allowed.
5. The following is an examiner's statement of reasons for allowance for claims 1 and 4: the prior art fails to teach or suggest an aqueous polishing solution with an acidic pH; and the organic-containing ammonium salt concentration that accelerates the TEOS removal. The closest prior art, Mahulikar, discloses an aqueous polishing composition with a basic pH (column 6, lines 12-16); and an organic-containing ammonium salt (column 6, lines 60-64). However, there is no motivation or suggestion of a polishing solution with an *acidic pH* and an organic-containing ammonium salt that *accelerates TEOS removal*. Wolf et al., *Silicon Processing for the VLSI Era*, Vol. 1, Lattice Press (1986), teaches that TEOS is a silicon oxide compound (page 184). Moreover, Wolf, *Silicon Processing for the VLSI Era*, Vol. 4, Lattice Press (2002), teaches

Art Unit: 1765

that a conventional oxide CMP slurry has a basic pH and that *polishing rate of the oxide increases with increasing pH* (page 369). However, there is no motivation of suggestion of an aqueous polishing solution with an acidic pH; and the organic-containing ammonium salt concentration that accelerates the TEOS removal, as in the context of claims 1 and 4.

6. The following is an examiner's statement of reasons for allowance for claims 11: the prior art fails to teach or suggest an aqueous polishing composition comprising silica particles; and a pH of 1.5 to 4. The closest prior art, Pasqualoni et al. (U.S. Patent No. 6,749,488), discloses an aqueous polishing composition comprising, by weight percent: 0.1 to 10 silica particles (column 4, lines 1-5); 0 to 10 oxidizing agent (column 5, lines 30-35); 0.25 to 4 benzotriazole (column 5, lines 50-53); a pH of 8 to 10.5 (column 6, lines 24-26); and 0.02 to 2 organic-containing ammonium salt (column 7, lines 7-10). Moreover, Wolf, *Silicon Processing for the VLSI Era*, Vol. 4, Lattice Press (2002), teaches that a conventional oxide CMP slurry containing silica has a basic pH and that polishing rate of the oxide increases with increasing pH (page 368-369). However, there is no motivation of suggestion of an aqueous polishing composition comprising silica particles; and a pH of 1.5 to 4, as in the context of claim 11.

7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

8. In view of Applicants' amendments (Applicants' Amendments to the Claims, page 3), filed Aug. 26, 2005, the rejection of claim 3 under 35 U.S.C. 112, second paragraph, has been withdrawn.

9. Applicant's arguments, (Applicants' Remarks, page 7), filed Aug. 26, 2005, with respect to the rejection of claims 1-3 under 35 U.S.C. 103(a) as being unpatentable over Honda, in view of Andideh and Wolf, have been fully considered and are persuasive. Applicants have correctly pointed out that the Honda reference does not contain the claim limitation of "abrasive particles" (page 7). The rejection of claims 1-3 has been withdrawn.

10. Applicant's arguments, (Applicants' Remarks, page 7), filed Aug. 26, 2005, with respect to the rejection of claims 4-7 under 35 U.S.C. 103(a) as being unpatentable over Mahulikar, in view of Andideh, have been fully considered and are persuasive. Applicants have correctly pointed out that the Mahulikar and Andideh references does not teach the use of organic-containing ammonium salt to accelerate TEOS removal (page 7). The rejection of claims 4-7 has been withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Chen whose telephone number is

Art Unit: 1765

(571) 272-2947. The examiner can normally be reached on Monday through Friday, 8AM to 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EBC
Oct. 11, 2005

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER
